

 United States
Department of
Agriculture

Soil
Conservation
Service

Spokane,
Washington



Washington Water Supply Outlook

January 1, 1987



Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall. This snowfall accumulates high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are viewed in conjunction with snowpack data to prepare runoff forecasts. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data and narratives describing current conditions.

Streamflow forecasts are cooperatively generated by Soil Conservation Service and National Weather Service hydrologists. Forecasts become more accurate as more data affecting runoff becomes known. For this reason, forecasts are issued that reflect three future precipitation conditions — Below Normal, Average, and Above Normal. These forecasts are termed reasonable minimum, most probable, and reasonable maximum. Actual streamflow can be expected to fall between the lower and upper forecast values eight out of ten years.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation, temperature, and other parameters are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. Because of the limited space, snow survey measurements are not published in monthly reports. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

| STATE | ADDRESS |
|------------|---|
| Alaska | 201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687 |
| Arizona | 201 East Indianola, Suite 200, Phoenix, AZ 85012 |
| Colorado | 2490 West 26th Ave., Denver, CO 80211 |
| New Mexico | 517 Gold Ave. S.W., Room 3301, Albuquerque, NM 97102 |
| Idaho | 304 North 8th Street, Room 345, Boise, ID 83702 |
| Montana | 10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715 |
| Nevada | 1201 Terminal Way, Room 219, Reno, NV 89502 |
| Oregon | 1220 Southwest 3rd Ave., Room 1640, Portland, OR 97208 |
| Utah | 4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147 |
| Washington | 360 U.S. Court House, Spokane, WA 99201 |
| Wyoming | Federal Building, 100 East "B" Street, Casper, WY 82601 |

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 547, Portland, OR 97209.

Published by other agencies:

Water Supply Outlook Reports prepared by other agencies include: California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A 3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Washington Water Supply Outlook

and

**Federal — State — Private
Cooperative Snow Surveys**

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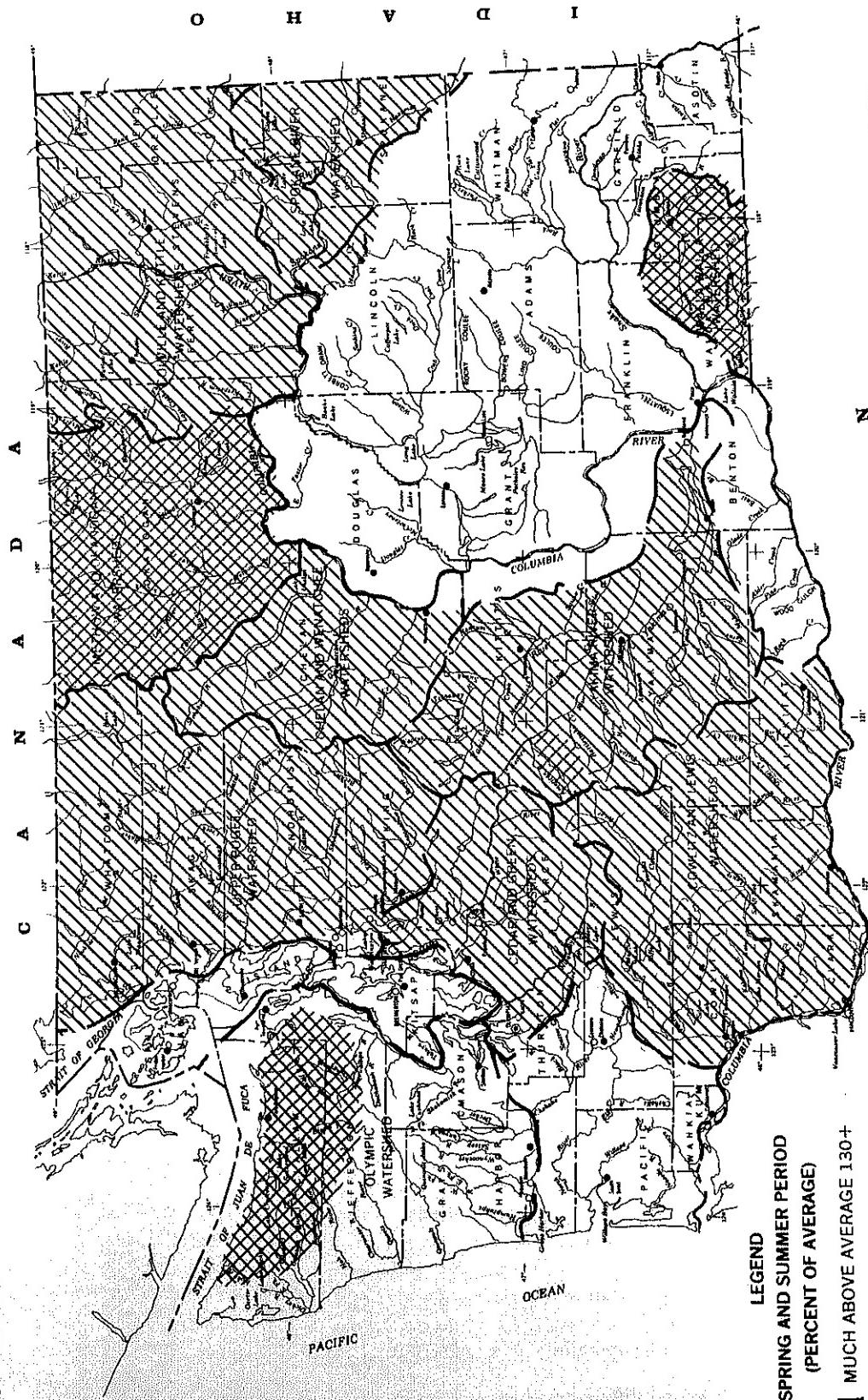
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or national origin.

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STREAMFLOW PROSPECTS WASHINGTON

January 1, 1987

0 25 50 75 100 MI
0 50 100 150 KM

GENERAL OUTLOOK

SUMMARY:

Washington water supply forecasts are for below normal runoff for 1987. Snow cover and Precipitation are below average continuing a trend set last year. Reservoir storage is below normal at the major irrigation projects throughout the state. Streamflows have been below the norm for late summer and fall months.

NOTE: Included in this years reports is the snow survey data.

SNOWPACK:

Very few manual snow measurements were scheduled and made for the January 1 period. Forecasters must rely on SNOTEL data for snowpack information. The January 1 statewide average is 73%. Storms during early January have made improvements to the snowpack. All Washington SNOTEL Sites are reporting snowpack, with Lyman Lake at 5900 feet in elevation having the largest with 27.1 inches of water content. The Columbia River Basin has a snowpack 63% of normal.

PRECIPITATION:

Precipitation values from SNOTEL sites indicate a water year value near 85% of average for the high mountain areas. Precipitation data from the National weather service sites, located mostly in lower valley areas, show values around the state vary from 35% in the Spokane Basin to 82% of normal for the Olympic Basin. Storms, the first week in January, have deposited over 5 inches at many sites along the Cascade Mountain range.

RESERVOIRS:

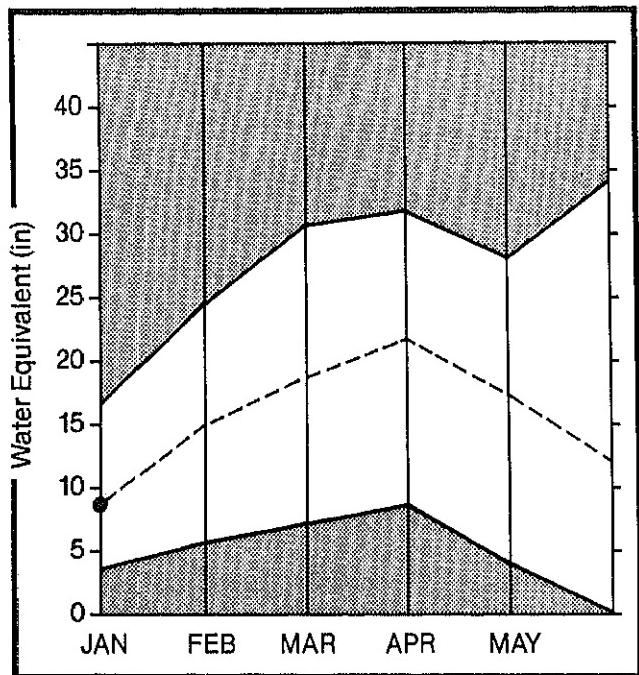
Reservoir storage is below average in Washington. Major irrigation reservoirs were drawn low the preceding summer when water supplies were also below normal. The Yakima Basin, which relies heavily upon stored water for irrigation, is at 58% of average. Columbia River reservoirs are near normal while storage in the Okanogan area is at 57% of capacity. Power reservoirs, such as Coeur d' Alene at 65% and Chelan Lake at 96% of normal, are suffering from low flows of last fall.

STREAMFLOW:

Streamflows are forecasted to be below normal for the coming spring and summer. Snowpack and water year to date precipitation values are below average over most of Washington. Forecasts vary from 72% in the Similkameen River to 93% in the Bumping River. December streamflows continued the summer and fall trend of below normal with only the Okanogan River at 101% being above average. Other December streamflows are; Spokane at Long Lake 76%, Pend Oreille River 75%, Columbia River at the International Boundary 86%, Chelan 65%, Snake 93%, Skagit 63%, and the Chehalis River 50%.

SPOKANE

Mountain snowpack* (inches)



*Based on selected stations

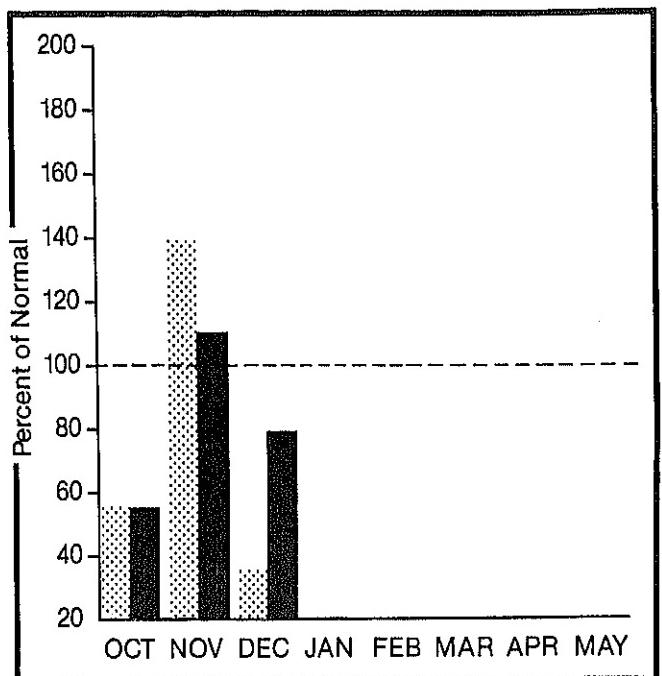
Maximum [diagonal lines]

Average [dashed line]

Minimum [solid grey]

Current [solid dot]

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation [diagonal lines]

Year to date precipitation [solid grey]

SPOKANE RIVER BASIN

WATER SUPPLY OUTLOOK:

Spokane River's forecasted spring and summer runoff is 88% of normal. This forecast is based upon a snowpack that is 89% of average and a water year to date precipitation value of 79% of normal. Data for snow cover was obtained from SNOTEL sites with no manual measurements made for the January 1 period. December streamflow in the Spokane River was 76% of normal. Storage in Coeur d' Alene Lake was 134,200 acre feet compared to 184,200 last year, average storage in Cd'A for January 1 is 207,700 ac. ft.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | I | MOST | MOSTIRMX | RMXIRMN | RMN |
|-----------------------|--------------|------|-------|-------|------|----------|---------|-----|
| | | Avg | IPROB | PROBI | % I | % | Avg | |
| SPOKANE at Post Falls | APR-SEP 2848 | 2480 | 87. | 3932 | 138 | 1028 | 36. | |
| | APR-JUL 2754 | 2400 | 87. | 3805 | 138 | 995 | 36. | |

- 1 - Reas, max, and reas, min, forecasts are for 5% and 95% exceedance levels and also (2) below.
 2 - Corrected for upstream diversions or changes in reservoir storage.
 The average is computed for the 1961-85 base period.

RESERVOIR STORAGE (1000AF)

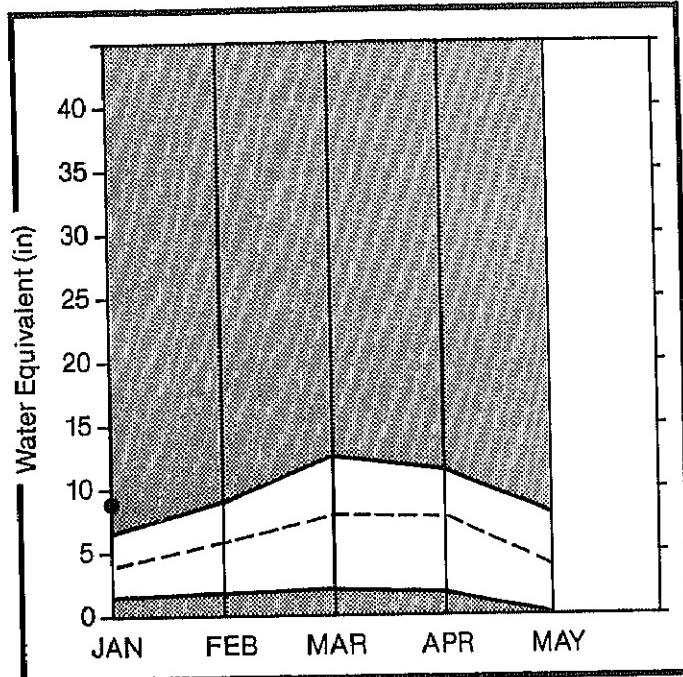
| RESERVOIR | USABLE CAPACITY | ** USABLE STORAGE ** | | |
|---------------|-----------------|----------------------|-----------|-------|
| | | THIS YEAR | LAST YEAR | AVE. |
| COEUR D'ALENE | 291.2 | 134.2 | 91.7 | 205.4 |

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | NO. COURSES AVE.D | THIS YEAR AS % OF | | |
|---------------|-------------------|-------------------|---------|--|
| | | LAST YR. | AVERAGE | |
| Spokane River | 13 | 121 | 84 | |

COLVILLE AND PEND OREILLE

Mountain snowpack* (inches)



*Based on selected stations

Maximum



Average



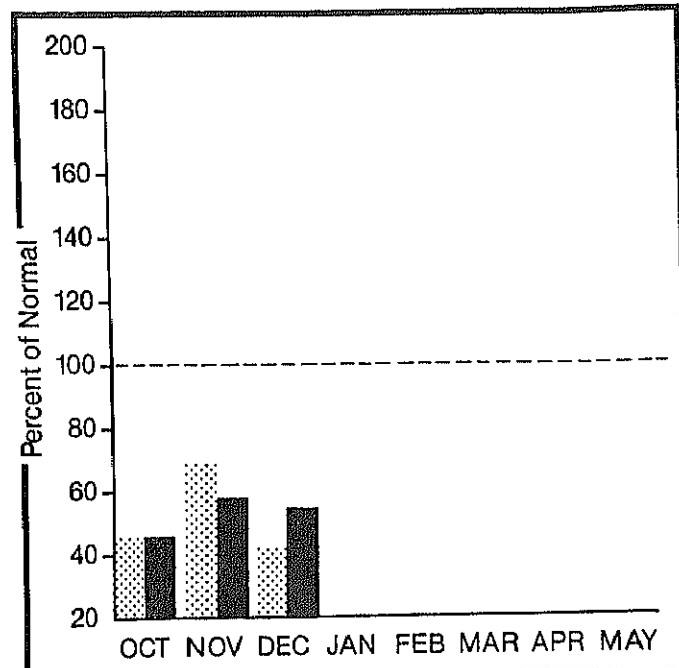
Minimum



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



COLVILLE - PEND OREILLE RIVER BASINS

WATER SUPPLY

OUTLOOK:

Forecasted streamflows for the Pend Oreille River is 84%, Kettle River 84% and the Colville River 82% of normal for the spring and summer runoff period. Streamflows for December were 75% of average on the Pend Oreille River, 72% on the Kettle River and 86% on the Columbia River at the international Boundary. Snowpack measurements in the Pend Oreille Basin are at 89% of normal based mainly on SNOTEL measurements. Manual measurements of snow will begin February 1. Precipitation during December was 41% of average and water year to date values are 54% of normal.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST 25YR AVG | IMOST | | MOSTIRMX | | % I % AVG | RMN AVG |
|----------------------------------|---------------|---------------------|-------|---------------|----------------|------|-----------------|------------|
| | | | KAF | IPROB 1KAF | PROBI % AVG | IKAF | | |
| PEND OREILLE RIVER b1 Box Canyon | APR-SEP 15425 | 13000 84. | 17011 | 110 | 8990 | 58. | | |
| | APR-JUL 14156 | 12000 85. | 15681 | 111 | 8319 | 59. | | |
| | APR-JUN 12227 | 10000 82. | 13179 | 108 | 6821 | 56. | | |
| COLVILLE RIVER at Kettle Falls | APR-SEP 134 | 110 82. | 177 | 132 | 43 | 32. | | |
| | APR-JUL 123 | 100 81. | 162 | 132 | 39 | 32. | | |
| | APR-JUN 114 | 90 77. | 147 | 129 | 33 | 29. | | |
| KETTLE RIVER nr Laurier | APR-SEP 1829 | 1540 84. | 2363 | 129 | 717 | 39. | | |
| | APR-JUL 1738 | 1460 84. | 2242 | 129 | 678 | 39. | | |
| | APR-JUN 1581 | 1260 80. | 1971 | 125 | 549 | 35. | | |
| COLUMBIA RIVER at Birchbank 2 | APR-SEP 44605 | 40300 90. | 50113 | 112 | 30487 | 68. | | |
| | APR-JUL 35705 | 32200 90. | 40055 | 112 | 24345 | 68. | | |
| | APR-JUN 26027 | 23500 90. | 29226 | 112 | 17774 | 68. | | |
| COLUMBIA RIVER at Grand Coulee 2 | APR-SEP 66841 | 58400 87. | 73105 | 109 | 43695 | 65. | | |
| | APR-JUL 56169 | 48900 87. | 61257 | 109 | 36543 | 65. | | |
| | APR-JUN 44036 | 38300 87. | 47988 | 109 | 28612 | 65. | | |

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RESERVOIR STORAGE (1000AF)

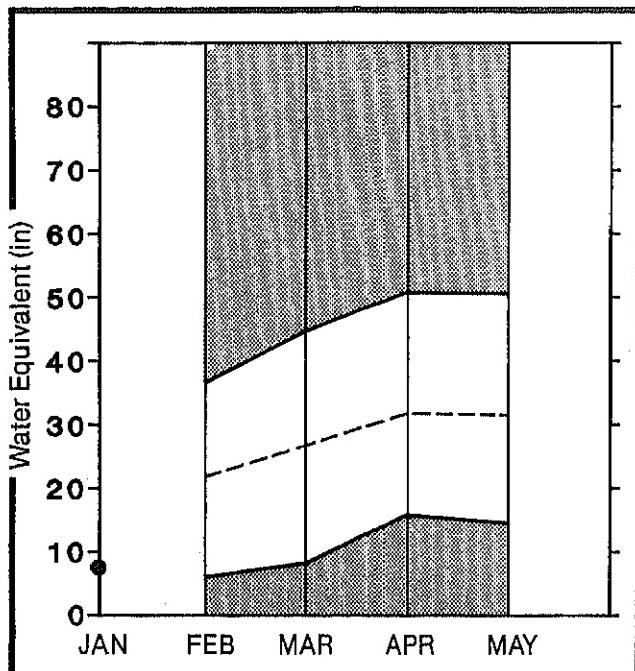
| RESERVOIR | USABLE CAPACITY | ** USABLE STORAGE ** | | |
|--------------------|--------------------|----------------------|-----------------|-----------------|
| | | THIS YEAR | LAST YEAR | AVE. |
| ROOSEVELT BANKS | 5232.0 715.0 | 4617.5 656.1 | 3293.0 391.0 | 4547.9 618.3 |

WATERSHED SNOWPACK ANALYSIS

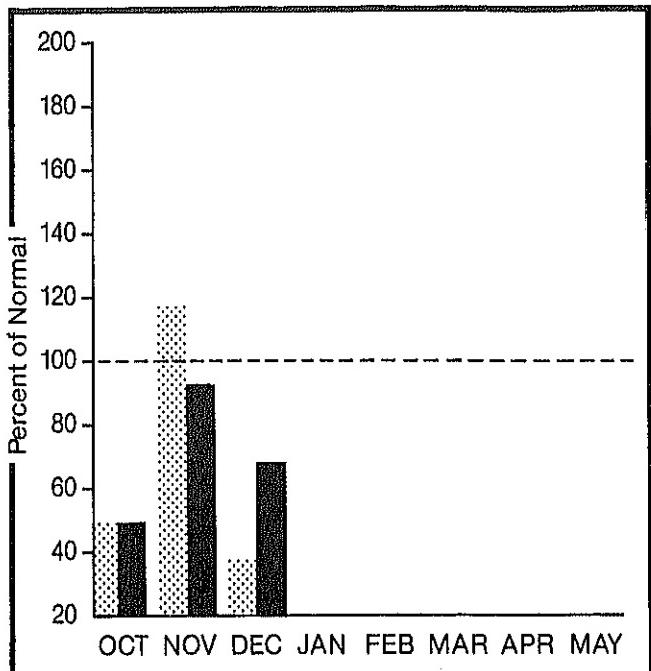
| WATERSHED | NO. COURSES AVE.D | % | |
|-----------------------|-------------------------|---|---|
| | | 1 | 2 |
| Colville River | 0 | | |
| Pend Oreille River | 9 | | |
| Kettle River | 2 | | |
| Omac Lake, Twin Lakes | 0 | | |
| Newman Lake | 1 | | |

OKANOGAN AND METHOW

Mountain snowpack* (inches)



Precipitation* (percent of normal)



*Based on selected stations

*Based on selected stations

Maximum Average

Minimum Current

Monthly precipitation

Year to date precipitation

OKANOGAN - METHOW RIVER BASINS

WATER SUPPLY OUTLOOK:

Streamflow in the Okanogan River was at 101% of average for December. Forecasts for spring and summer on the Okanogan River are for runoff of 91% of normal and 90% on the Methow River. Snow cover as of January 1 is at 74%, based upon SNOTEL data. Manual snow surveys are scheduled for February 1. Precipitation in December was at 38% with water year to date 68% of average. Storage in the Conconully Reservoirs is at 13,400 acre feet which is 57% of capacity.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | IMOST | MOSTIRMX | RMXIRMN | RMN | |
|-----------------------------|---------|------|------|---------------|------------------|---------|---------|-------|
| | | Avg | KAF | IPIRB IKAF | PROB ZAVGIKAF | % I | AvgIKAf | % Avg |
| SIMILKAMEEN R, nr Nighthawk | APR-SEP | 1462 | 1390 | 95. | 2443 | 167 | 337 | 23. |
| | APR-JUL | 1365 | 1300 | 95. | 2283 | 167 | 317 | 23. |
| | APR-JUN | 1161 | 1100 | 95. | 1936 | 167 | 264 | 23. |
| OKANOGAN R, nr Tonasket | APR-SEP | 1644 | 1500 | 91. | 2700 | 164 | 300 | 18. |
| | APR-JUL | 1497 | 1360 | 91. | 2453 | 164 | 267 | 18. |
| | APR-JUN | 1262 | 1150 | 91. | 2071 | 164 | 229 | 18. |
| METHOW RIVER nr Pateros | APR-SEP | 980 | 880 | 90. | 1213 | 124 | 547 | 56. |
| | APR-JUL | 908 | 820 | 90. | 1129 | 124 | 511 | 56. |
| | APR-JUN | 773 | 700 | 91. | 963 | 125 | 437 | 57. |

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2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

RESERVOIR STORAGE (1000AF)

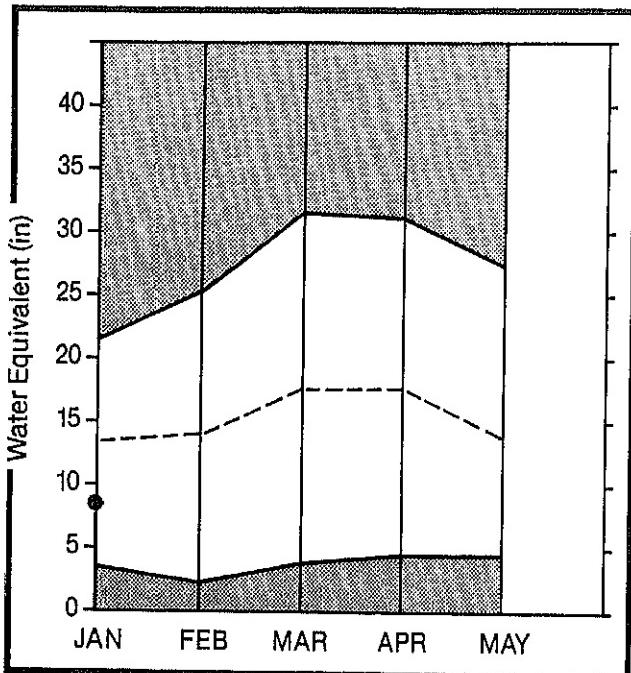
| RESERVOIR | USABLE CAPACITY | ** USABLE STORAGE ** | | |
|--------------------------|-----------------|----------------------|-----------|------|
| | | THIS YEAR | LAST YEAR | AVE. |
| CONCONULLY LAKE (SALMON) | 10.5 | 8.0 | 8.0 | 7.5 |
| CONCONULLY RESERVOIR | 13.0 | 9.0 | 9.4 | 9.9 |

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | NO. COURSES AVE.D | THIS YEAR AS % OF | | |
|----------------|-------------------|-------------------|---------|--|
| | | LAST YR. | AVERAGE | |
| Okanogan River | 17 | 102 | 78 | |
| Methow River | 2 | 115 | 63 | |

WENATCHEE AND CHELAN

Mountain snowpack* (inches)



*Based on selected stations

Maximum



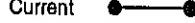
Average



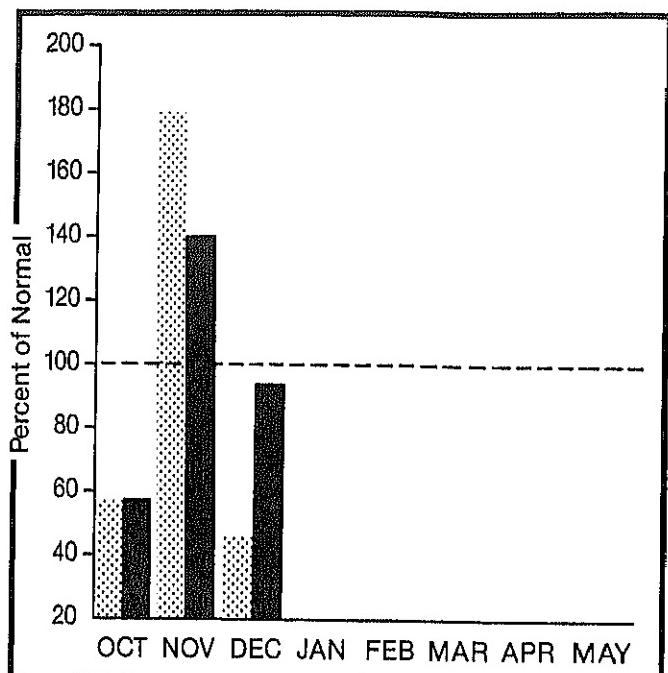
Minimum



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



WENATCHEE - CHELAN RIVER BASINS

WATER SUPPLY OUTLOOK:

Snowpack in the Wenatchee-Chelan Basin is at 86% of normal. Streamflows for December were 65% of average for the Chelan River and 70% on the Wenatchee River. Runoff for spring and summer is forecasted to be 90% of normal in the Wenatchee and 83% in the Chelan Basin. Stehekin River runoff is forecasted to be 85% of average. Precipitation during December was 46% in the Wenatchee and 46% in Chelan. Reservoir storage in Lake Chelan is at 365,000 acre feet or 96% of normal for January 1.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | 1MOS | MOST | IRMX | RMXIRMN | RMN |
|----------------------------------|---------|-------|--------------|----------------|----------|-------|---------|-----|
| | | Avg | IFROB KAF | FROBI ZIKAF | ZAVGIKAF | % AVG | % | |
| CHELAN RIVER at Chelan 1 | APR-SEP | 1203 | 1000 | 83 | 1349 | 112 | 651 | 54. |
| | APR-JUL | 1055 | 880 | 83 | 1186 | 112 | 574 | 54. |
| | APR-JUN | 826 | 660 | 80 | 900 | 109 | 420 | 51. |
| STEHEKIN R. at Stehekin | APR-SEP | 860 | 730 | 85 | 945 | 110 | 515 | 60. |
| | APR-JUL | 727 | 620 | 85 | 802 | 110 | 438 | 60. |
| | APR-JUN | 553 | 470 | 85 | 608 | 110 | 332 | 60. |
| ENTIAT RIVER nr Ardenvoir | APR-SEP | 235 | 179 | 75 | 234 | 100 | 116 | 49. |
| | APR-JUL | 213 | 160 | 75 | 213 | 100 | 107 | 50. |
| | APR-JUN | 172 | 130 | 76 | 173 | 101 | 87 | 51. |
| WENATCHEE RIVER at Plain | APR-SEP | 1270 | 1140 | 90 | 1597 | 126 | 683 | 54. |
| | APR-JUL | 1113 | 1000 | 90 | 1401 | 126 | 599 | 54. |
| | APR-JUN | 899 | 800 | 89 | 1124 | 125 | 476 | 53. |
| STEMILT nr Wenatchee (miners in) | MAY-SEP | 138 | 110 | 80 | 160 | 116 | 60 | 43. |
| ICICLE CREEK nr Leavenworth | APR-SEP | 370 | 330 | 89 | 463 | 125 | 197 | 53. |
| | APR-JUL | 340 | 300 | 88 | 422 | 124 | 178 | 52. |
| | APR-JUN | 270 | 240 | 89 | 337 | 125 | 143 | 53. |
| COLUMBIA R. b1 Rock Island Dam 2 | APR-SEP | 72781 | 64300 | 88 | 81767 | 112 | 46833 | 64. |
| | APR-JUL | 61601 | 54200 | 88 | 68984 | 112 | 39416 | 64. |
| | APR-JUN | 48384 | 42800 | 88 | 54212 | 112 | 30988 | 64. |

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RESERVOIR STORAGE (1000AF)

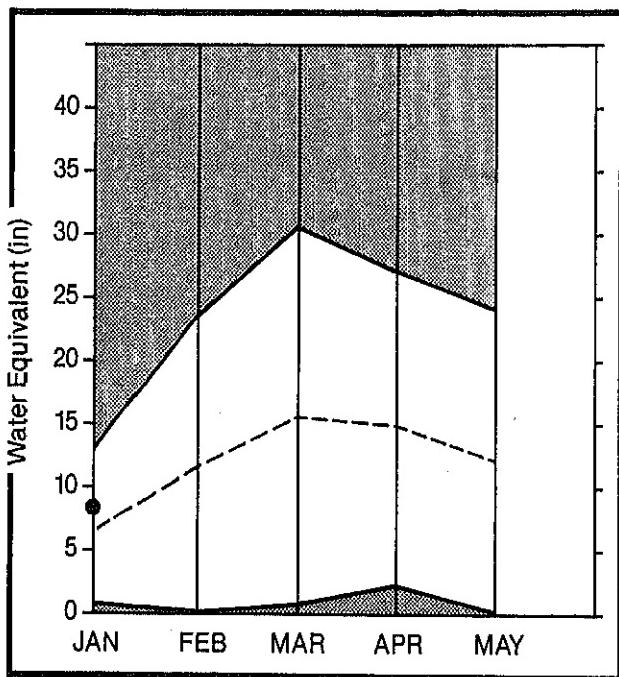
| RESERVOIR | USABLE CAPACITY | ** USABLE STORAGE ** | | |
|-------------|--------------------|----------------------|--------------|-------|
| | | THIS YEAR | LAST YEAR | AVE. |
| CHELAN LAKE | 676.1 | 365.0 | 365.7 | 378.7 |

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | NO. COURSES | NO. THIS YEAR AS % OF | | |
|-------------------|-------------|-----------------------|----------|---------|
| | | AVE.D | LAST YR. | AVERAGE |
| Chelan Lake Basin | 4 | 143 | 97 | |
| Entiat River | 10 | 0 | 0 | |
| Wenatchee River | 6 | 117 | 84 | |
| Colockum Creek | 1 | 44 | 67 | |
| Squilchuck Creek | 0 | 0 | 0 | |
| Stemilt Creek | 0 | 0 | 0 | |

YAKIMA

Mountain snowpack* (inches)



*Based on selected stations

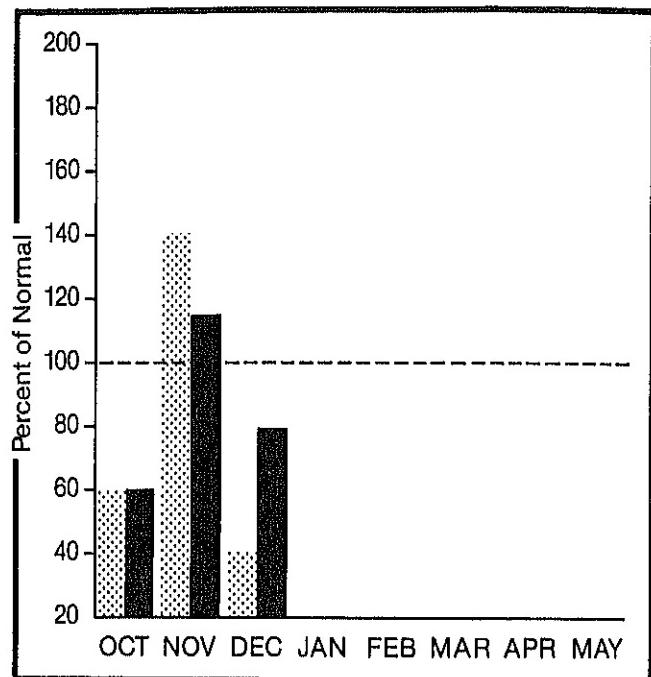
Maximum [Shaded Box]

Average [Dashed Line]

Minimum [Shaded Box]

Current [Solid Line with Circle]

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation [Hatched Box]

Year to date precipitation [Solid Box]

YAKIMA RIVER BASIN

WATER SUPPLY OUTLOOK:

Reservoir storage continues low, with January 1 values for the five major reservoirs at 337,900 acre feet or 58% of normal. December streamflow was not available due to icing of the stream gage. Forecasts for the Yakima Basin runoff are 84% of normal, and for the Yakima River at Cle Elum 84%, Naches River 85%, the Yakima River at Parker 84% and Ahtanum Creek 83%. Snowpack is 84% of average in the Yakima basin. Precipitation for December was 40% of normal and 79% for the water year to date.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

| FORECAST | FCST PERIOD | 25YR AVG | IMOST KAF | IPROB XAVGIKAF | MOSTIRMX Z I | RHMXRHM | RMN |
|----------------------------|----------------|-------------|--------------|-------------------|-----------------|---------|-----|
| | | | | | | Avg | Avg |
| YAKIMA RIVER at Martin 1 | APR-SEP 139 | 120 | 84 | 158 | 114 82 | 59. | |
| | APR-JUL 128 | 110 | 86 | 136 | 106 84 | 66. | |
| | APR-JUN 111 | 95 | 86 | 114 | 103 76 | 68. | |
| YAKIMA RIVER at Cle Elum 2 | APR-SEP 943 | 790 | 84 | 941 | 100 639 | 68. | |
| | APR-JUL 854 | 710 | 83 | 847 | 99. 573 | 67. | |
| | APR-JUN 734 | 620 | 84 | 737 | 100 503 | 69. | |
| YAKIMA RIVER nr Parker 2 | APR-SEP 2096 | 1760 | 84 | 2326 | 111 1194 | 57. | |
| | APR-JUL 1898 | 1590 | 84 | 2102 | 111 1078 | 57. | |
| | APR-JUN 1667 | 1400 | 84 | 1850 | 111 950 | 57. | |
| KACHESS RIVER nr Easton 1 | APR-SEP 121 | 100 | 83 | 139 | 115 61 | 50. | |
| | APR-JUL 115 | 95 | 82 | 132 | 115 58 | 50. | |
| | APR-JUN 101 | 95 | 84 | 117 | 116 53 | 52. | |
| CLE ELUM RIVER nr Roslyn 1 | APR-SEP 463 | 410 | 89 | 516 | 111 304 | 66. | |
| | APR-JUL 422 | 370 | 88 | 450 | 107 290 | 69. | |
| | APR-JUN 353 | 300 | 85 | 367 | 104 233 | 66. | |
| BUMPING RIVER nr Nile 1 | APR-SEP 142 | 130 | 72 | 171 | 120 89 | 63. | |
| | APR-JUL 129 | 120 | 73 | 157 | 122 83 | 64. | |
| | APR-JUN 107 | 78 | 72 | 129 | 121 67 | 63. | |
| AMERICAN RIVER nr Nile | APR-SEP 124 | 110 | 89 | 147 | 119 73 | 59. | |
| | APR-JUL 113 | 100 | 89 | 134 | 119 66 | 58. | |
| | APR-JUN 94 | 83 | 88 | 111 | 118 55 | 59. | |
| TIETON RIVER at Tieton 1 | APR-SEP 246 | 200 | 81 | 249 | 101 151 | 61. | |
| | APR-JUL 207 | 170 | 82 | 211 | 102 129 | 62. | |
| | APR-JUN 165 | 140 | 85 | 173 | 105 107 | 65. | |
| NACHES RIVER nr Naches 2 | APR-SEP 867 | 740 | 85 | 1017 | 117 463 | 53. | |
| | APR-JUL 784 | 670 | 85 | 921 | 117 419 | 53. | |
| | APR-JUN 667 | 570 | 85 | 783 | 117 357 | 54. | |
| AHTANUM CREEK nr Tampico 2 | APR-SEP 47 | 35 | 83 | 60 | 128 18.0 | 38. | |
| | APR-JUL 43 | 36 | 84 | 55 | 128 17.0 | 40. | |
| | APR-JUN 37 | 31 | 84 | 48 | 130 14.0 | 38. | |

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The average is computed for the 1961-83 base period.

RESERVOIR STORAGE (1000AF)

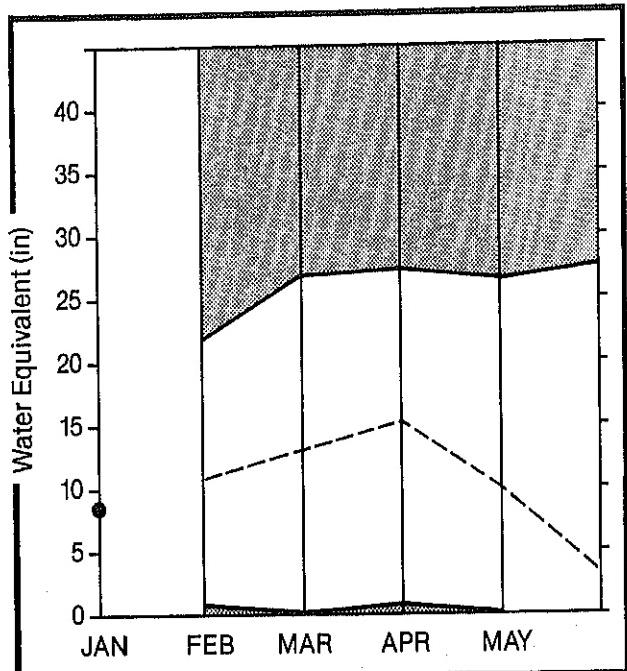
| RESERVOIR | USABLE CAPACITY | ** USABLE STORAGE ** | | |
|--------------|--------------------|----------------------|--------------|-------|
| | | THIS YEAR | LAST YEAR | AVE. |
| KEECHELUS | 157.8 | 69.2 | 59.2 | 83.0 |
| KACHESS | 239.0 | 69.5 | 68.4 | 159.4 |
| CLE ELEM | 436.9 | 102.2 | 119.5 | 230.2 |
| BUMPING LAKE | 33.7 | 12.4 | 14.3 | 24.0 |
| RIMROCK | 198.0 | 103.6 | 119.8 | 202.1 |

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | NO. COURSES AVE.D | THIS YEAR AS % OF LAST YR. AVERAGE | | |
|-------------------------------|----------------------|---------------------------------------|-----------|-----------|
| | | 1 | 2 | 3 |
| Yakima River Ahtanum Creek | 14 2 | 100 88 | 88 100 | 88 100 |

WALLA WALLA

Mountain snowpack* (inches)

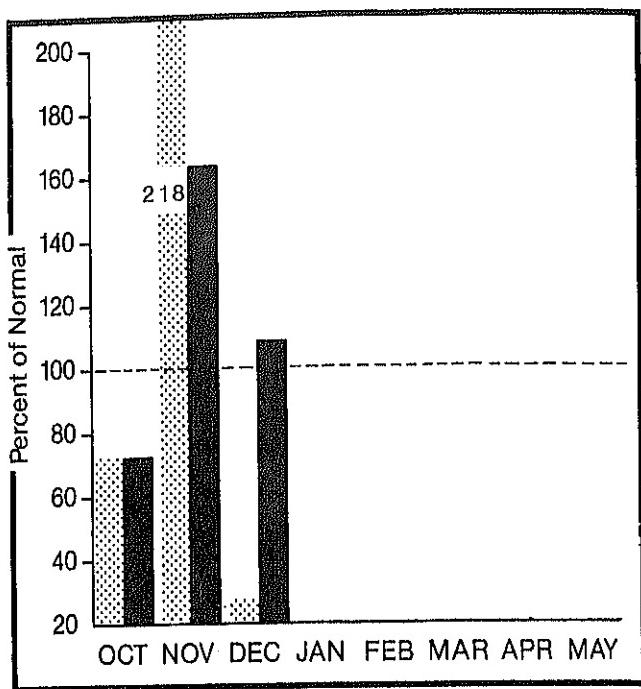


*Based on selected stations

Maximum [Shaded Box]
Minimum [Solid Box]

Average [Dashed Line]
Current [Line with Circle]

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation [Hatched Box]
Year to date precipitation [Solid Box]

Year to date precipitation

WALLA WALLA RIVER BASIN

WATER SUPPLY OUTLOOK:

Snowpack in the Walla Walla River basin is 84% of normal. Precipitation for December was 28% of average and the water year to date precipitation has been 109% of normal. Forecasted streamflow in the Walla Walla Basin is 91% of average. Streamflow for December in the Walla Walla River was 49% of normal.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | IMOST | MOST | IRMX | RMXIRMN | RMN |
|-----------------------------|---------|--------|-------|-------|-----------|-------|---------|-----|
| | | Avg | IProb | Prob1 | % I | % | AvgIKAF | Avg |
| MILL CREEK at Walla Walla | APR-SEP | 17.5 | 16.0 | 91. | 22 | 126 | 10.0 | 57. |
| | APR-JUL | 17.3 | 15.7 | 91. | 22 | 127 | 10.0 | 58. |
| | APR-JUN | 17.2 | 15.6 | 91. | 22 | 128 | 10.0 | 58. |
| COLUMBIA R. at The Dalles 2 | APR-SEP | 101000 | 84000 | 83. | 110260109 | 57740 | 57. | |
| | APR-JUL | 86500 | 71800 | 83. | 94290 | 109 | 49310 | 57. |
| | APR-JUN | 70100 | 58200 | 83. | 76426 | 109 | 39974 | 57. |

1 - Reas, max, and reas, min, forecasts are for 5% and 95% exceedance levels and also (2) below.

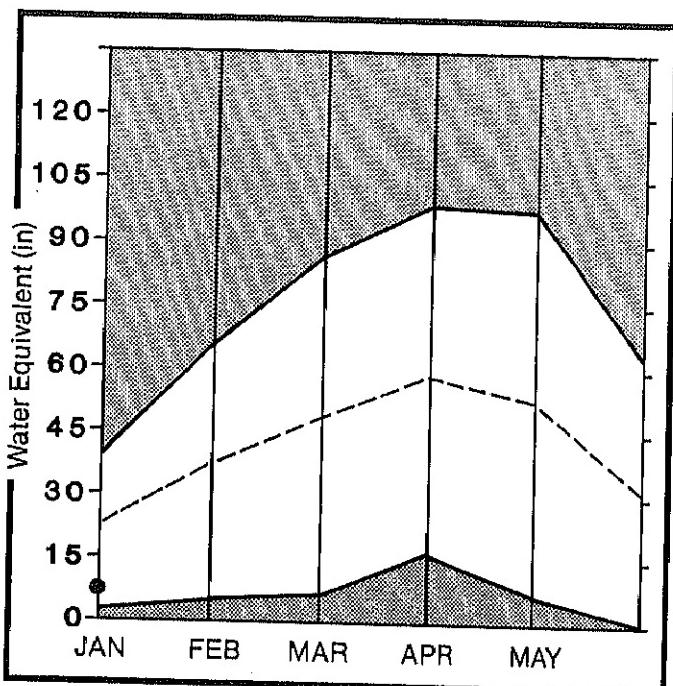
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

WATERSHED SNOWPACK ANALYSIS

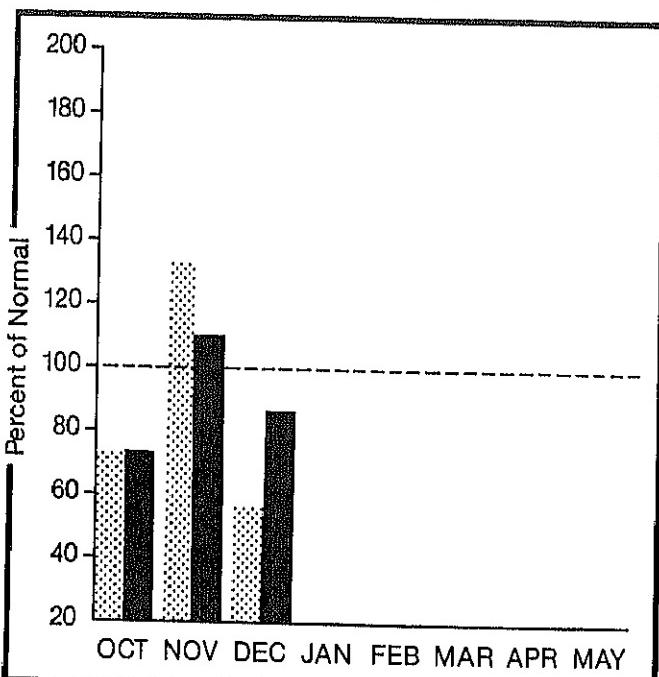
| WATERSHED | NO. COURSES AVE.D | THIS YEAR AS % OF | | |
|------------|----------------------|-------------------|----------|---------|
| | | ----- | LAST YR. | AVERAGE |
| Mill Creek | 1 | 161 | 84 | |

COWLITZ AND LEWIS

Mountain snowpack* (inches)



Precipitation* (percent of normal)



*Based on selected stations

*Based on selected stations

Maximum █ Average - - -
Minimum █ Current ● - ●

Monthly precipitation █ Year to date precipitation █

COWLITZ - LEWIS RIVER BASINS

WATER SUPPLY OUTLOOK:

Snow cover for the Cowlitz-Lewis Basin is at 77% of normal. This compares to last years 63% at this time. Maximum water content was noted at the Paradise SNOTEL site where the snow pack contained 23.7 inches of water on January 1. Streamflow is forecasted to be near normal for the coming water year. Forecasts for the Lewis River is 88% and for the Cowlitz River 88%. Precipitation was 56% of normal for December. Water year to date precipitation has been 86% of average.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | I | MOST | IRMX | RMX | RMN |
|------------------------------|---------|------|------|-------|-------|------|---------|-----|
| | | AVG | KAF | IPROB | PROB1 | % I | Avg1Kaf | Avg |
| LEWIS RIVER at Ariel 2 | APR-SEP | 1249 | 1100 | 88. | 1625 | 130 | 575 | 46. |
| | APR-JUL | 1086 | 960 | 88. | 1416 | 130 | 504 | 46. |
| | APR-JUN | 961 | 850 | 88. | 1254 | 130 | 446 | 46. |
| COWLITZ R. b1 Mayfield Dam 2 | APR-SEP | 2038 | 1790 | 88. | 2707 | 133 | 873 | 43. |
| | APR-JUL | 1778 | 1560 | 88. | 2360 | 133 | 760 | 43. |
| | APR-JUN | 1502 | 1320 | 88. | 1996 | 133 | 644 | 43. |
| COWLITZ R. at Castle Rock 2 | APR-SEP | 2673 | 2350 | 88. | 3018 | 113 | 1682 | 63. |
| | APR-JUL | 2323 | 2100 | 90. | 2681 | 115 | 1519 | 65. |
| | APR-JUN | 1980 | 1750 | 88. | 2245 | 113 | 1255 | 63. |

1 - Reas, max, and reas, min, forecasts are for 5% and 95% exceedance levels and also (2) below.

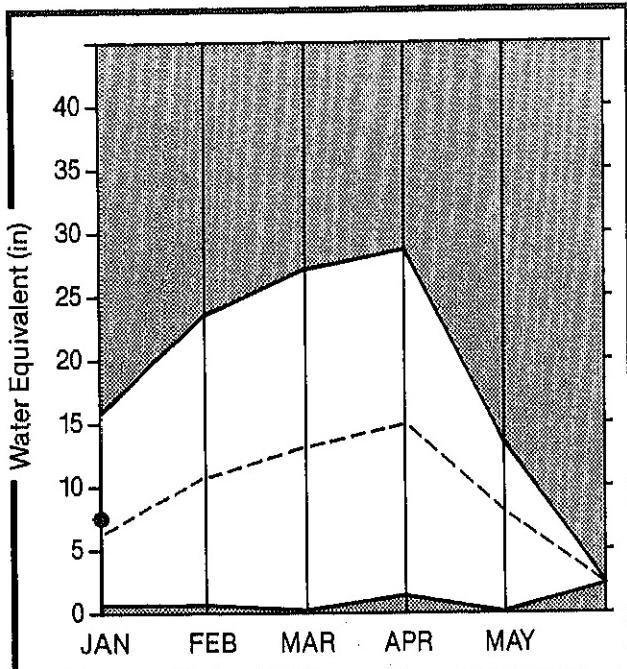
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | NO. | THIS YEAR AS % OF | | |
|---------------|---------|-------------------|----------|---------|
| | COURSES | AVE.D | LAST YR. | AVERAGE |
| Cowlitz River | 1 | 93 | 68 | |
| Lewis River | 4 | 92 | 78 | |

WHITE - GREEN

Mountain snowpack* (inches)



*Based on selected stations

Maximum



Average



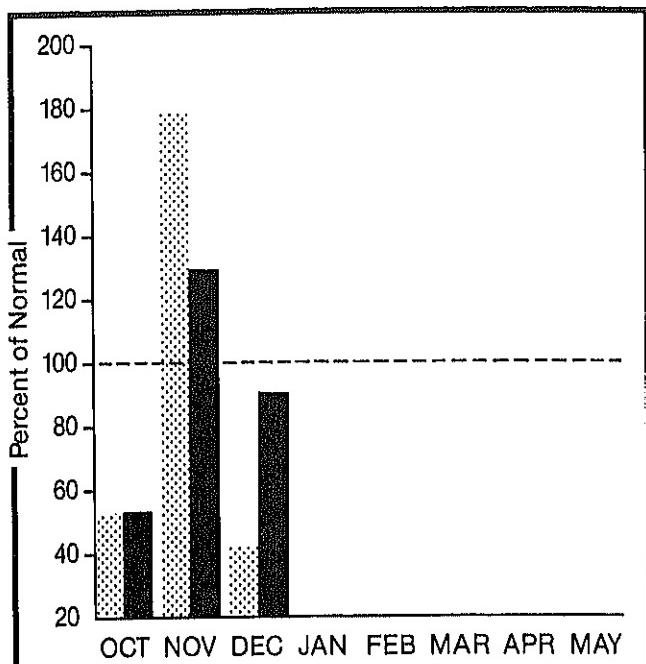
Minimum



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



WHITE - GREEN RIVER BASINS

WATER SUPPLY OUTLOOK:

Summer runoff is forecasted to be 82% of normal on the Green River and 86% on the Cedar River. Water content at the Stampede Pass SNOTEL site showed 21.1 inches of water content on January 1. December runoff was near 60% of average. Precipitation was 41% of normal for December, bringing the water year to date to 91% of average. Snowpack is 74% of normal for the basin.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | I | MOST | MOST | IRMX | RMX | IRMN | RMN |
|------------------------------------|---------|------|------|-------|-------|------|------|-----|------|-----|
| | | Avg | Kaf | Iprob | Prob1 | Zavg | Ikaf | Avg | Ikaf | Avg |
| GREEN RIVER b1 Howard Hanson Dam 2 | APR-SEP | 316 | 260 | 82 | 371 | 117 | 149 | 47 | | |
| | APR-JUL | 284 | 240 | 85 | 339 | 119 | 141 | 50 | | |
| | APR-JUN | 256 | 210 | 82 | 300 | 117 | 120 | 47 | | |
| CEDAR RIVER nr Cedar Falls | APR-SEP | 93 | 80 | 86 | 113 | 122 | 47 | 51 | | |

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.

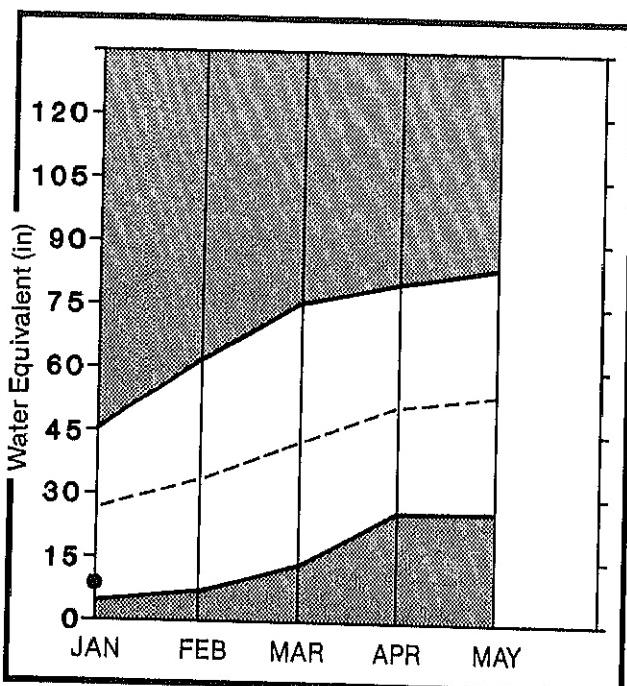
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

WATERSHED SNOWPACK ANALYSIS

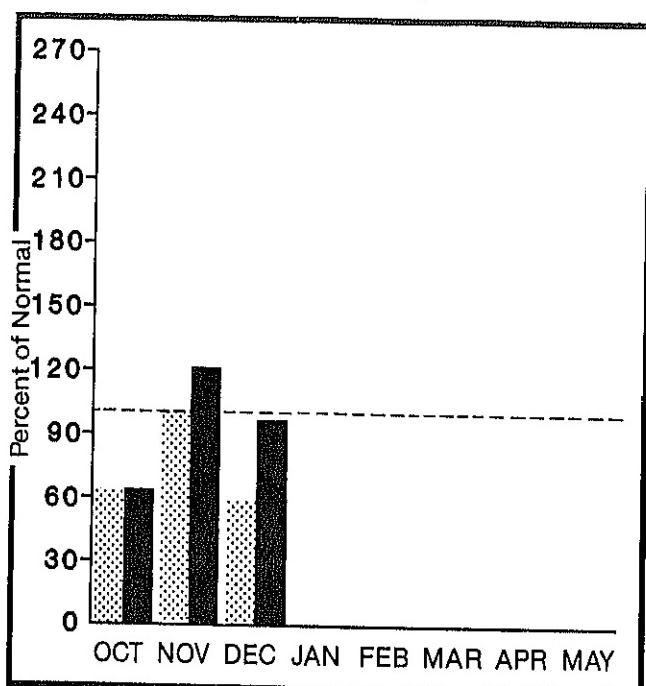
| WATERSHED | COURSES AVE.D | NO. | THIS YEAR AS % OF | |
|-------------|------------------|----------|-------------------|---------|
| | | Last Yr. | | Average |
| White River | | 2 | 150 | 116 |
| Green River | | 7 | 122 | 86 |

NORTH PUGET SOUND

Mountain snowpack* (inches)



Precipitation* (percent of normal)



*Based on selected stations

*Based on selected stations

Maximum ████ Average -----
Minimum ████ Current ●—●

Monthly precipitation ████ Year to date precipitation ████

NORTH PUGET SOUND RIVER BASINS

WATER SUPPLY OUTLOOK:

Snow cover for the North Puget Basin is 71% of normal, with the Harts Pass SNOTEL site having 19.1 inches of water content as of January 1. Precipitation values for December were 58% of average, with a water year to date at 95%. Forecasted runoff for the Skagit River is 94% of normal. Reservoir storage is below average with Ross storing 1,178,700 acre feet as of January 1, compared to last years 1,206,000 acre feet.

For more information contact your local Soil Conservation Service office.

STREAMFLOW FORECASTS

| FORECAST PERIOD | FCST | 25YR | IMOST | MOSTIRMX | RMXIRMN | RMN | |
|----------------------------|--------------|-------|----------|----------|---------|------|-----|
| | Avg | IProb | ProbI | % | % | % | |
| | KAF | IKAF | XAVGIKAF | AvgIKAF | Avg | | |
| SKAGIT RIVER at Newhalem 2 | APR-SEP 2356 | 2210 | 94. | 2823 | 120 | 1597 | 68. |
| | APR-JUL 1972 | 1850 | 94. | 2363 | 120 | 1337 | 68. |
| | APR-JUN 1485 | 1400 | 94. | 1786 | 120 | 1014 | 68. |

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2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

RESERVOIR STORAGE (1000AF)

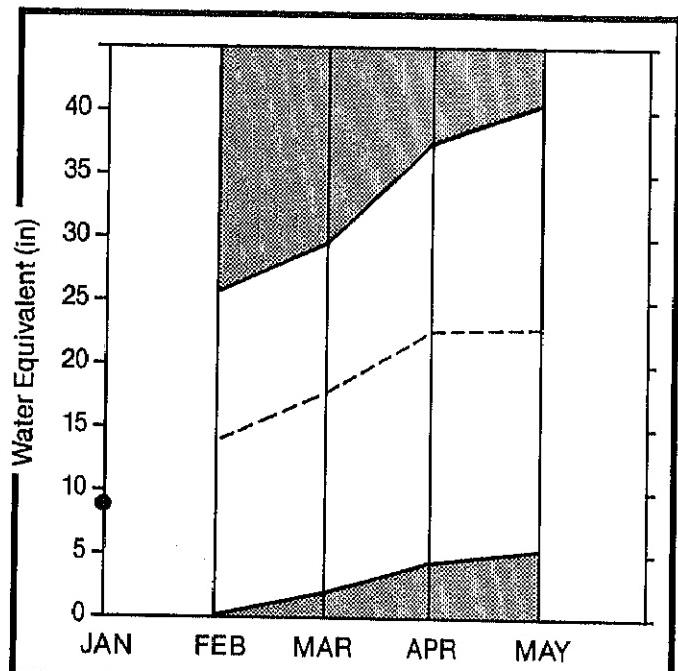
| RESERVOIR | USABLE CAPACITY | ** USABLE STORAGE ** | | |
|------------------|--------------------|----------------------|--------------|-------|
| | | THIS YEAR | LAST YEAR | AVE. |
| ROSS | 1404.1 | 1178.7 | 1096.0 | 783.9 |
| DIABLO RESERVOIR | 90.6 | 84.6 | 84.8 | 84.7 |
| GORG RESERVOIR | 9.8 | 8.0 | 7.6 | 7.7 |

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | NO. COURSES AVE.D | THIS YEAR AS % OF | | |
|------------------|-------------------------|-------------------|---------|--|
| | | LAST YR. | AVERAGE | |
| Skagit River | 3 | 101 | 78 | |
| Baker River | 0 | 0 | 0 | |
| Cedar River | 0 | 0 | 0 | |
| Snoqualmie River | 0 | 0 | 0 | |
| Skykomish River | 2 | 128 | 88 | |

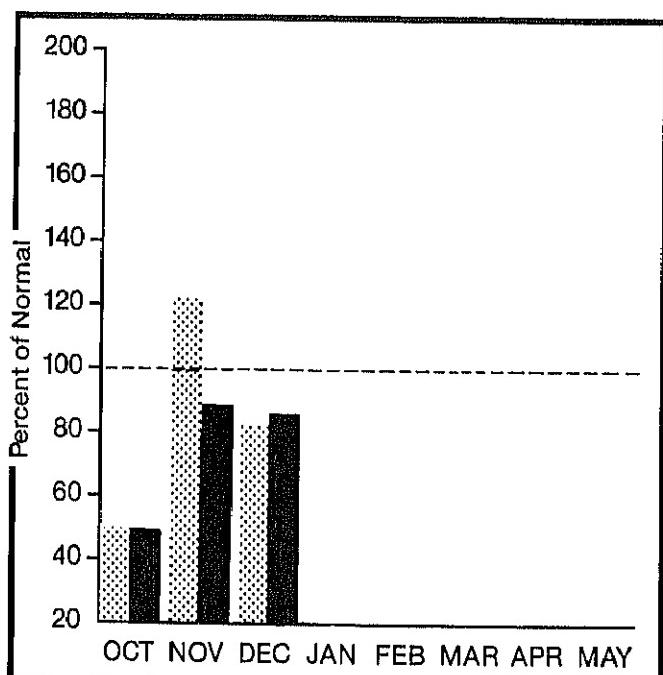
OLYMPIC

Mountain snowpack* (inches)



*Based on selected stations

Precipitation* (percent of normal)



*Based on selected stations

Maximum [solid bar] Average [dashed line]
Minimum [solid bar] Current [line with dots]

Monthly precipitation [hatched bar] Year to date precipitation [solid bar]

OLYMPIC PENINSULA RIVER BASINS

WATER SUPPLY OUTLOOK:

December precipitation was 82% of normal. The water year to date accumulation is 86% of average. Snow cover is estimated to be 90% of normal based upon snow pillow data from Carroll Pass on the Wynoochee River. Area streamflow was below normal during December. Forecasts of runoff for the Dungeness River is 90% of average and on the Elwha River 90%.

STREAMFLOW FORECASTS

| FORECAST | PERIOD | FCST | 25YR | 1MOS | MOSTIRMX | RMXIRMN | RMN |
|-----------------------------|---------|------|---------|---------|----------|---------|-----|
| | | Avg | IProb | Prob1 | % I | % | |
| | KAF | IKAf | ZAVGKAF | AvgIKAf | Avg | | |
| DUNGENESS RIVER nr Sequim | APR-SEP | 160 | 144 | 90 | 176 | 110 112 | 70. |
| | APR-JUL | 130 | 117 | 90 | 143 | 110 91 | 70. |
| | APR-JUN | 97 | 87 | 90 | 106 | 109 68 | 70. |
| ELWHA RIVER nr Port Angeles | APR-SEP | 553 | 500 | 90 | 611 | 110 389 | 70. |
| | APR-JUL | 454 | 410 | 90 | 501 | 110 319 | 70. |

1 - Reas, max, and reas, min, forecasts are for 5% and 95% exceedance levels and also (2) below.

2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

WATERSHED SNOWPACK ANALYSIS

| WATERSHED | COURSES AVE.D | NO. | THIS YEAR AS % OF | |
|-----------------|------------------|----------|-------------------|--|
| | | LAST YR. | AVERAGE | |
| Dungeness River | 0 | 0 | 0 | |
| Morse Creek | 0 | 0 | 0 | |
| Elwha River | 0 | 0 | 0 | |

DATA CURRENT AS OF: 1/ 9/87 11:58:14

**BASIN SUMMARY OF
SNOW COURSE DATA**
JANUARY 1987

| SNOW COURSE | ELeVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-85 | SNOW COURSE | ELeVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-85 |
|---------------------------|-----------|----------|------------|---------------|-----------|-----------------|--------------------------|-----------|----------|------------|---------------|-----------|-----------------|
| PEND OREILLE RIVER | | | | | | | | | | | | | |
| BENTON MEADOW | 2370 | 12/30/86 | 6 | 1.2 | 2.2 | 3.0 | COLOCUM CREEK | | | | | | |
| BENTON SPRING | 4920 | 12/30/86 | 26 | 6.4 | 5.1 | 8.6 | TROUGH #2 | FILLOH | 5310 | 1/01/87 | --- | 3.5E | 7.9 |
| HEART LAKE TRAIL | 4800 | 12/28/87 | 27 | 6.7 | 6.9 | 9.2 | SQUILCHUCK CREEK | | | | | | 5.1 |
| HODODOO BASIN | 6050 | 12/28/86 | 56 | 17.8 | 16.7 | 21.5 | STEMILY CREEK | | | | | | |
| HODODOO CREEK | 5900 | 12/29/86 | 48 | 14.6 | 12.6 | 19.1 | YAKIMA RIVER | | | | | | |
| LOOKOUT | 5140 | 1/05/87 | 50 | 13.6 | 10.5 | 14.5 | AHANTUK R.S. | 3100 | 12/29/86 | 14 | 2.6 | 6.4 | 3.6 |
| NELSON | CAN. | 3100 | 1/07/87 | 35 | 8.3 | 4.4 | BIG BULLER CREEK | 3200 | 12/31/86 | 34 | 6.4 | 5.7 | 7.2 |
| SCHWEITZER BOWL | 4800 | 12/29/86 | 39 | 10.4 | 8.8 | 13.8 | ELEPHANT PASS#2FILLOH | 4270 | 1/01/87 | --- | 5.9E | 9.1 | 11.5 |
| SCHWEITZER RIDGE | 6200 | 12/29/86 | 52 | 17.9 | 15.7 | 21.3 | BUMPING LAKE | 3450 | 12/29/86 | 22 | 3.8 | 5.2 | 6.5 |
| COLVILLE RIVER | | | | | | | BUMPING LAKE (NEW) | 3400 | 12/29/86 | 27 | 4.8 | 5.8 | 6.0 |
| KETTLE RIVER | | | | | | | CORRAL PASS | FILLOH | 6000 | 1/01/87 | --- | 22.5E | 13.7 |
| BIG WHITE MTN | CAN. | 5510 | 12/30/86 | 31 | 5.9 | 7.3 | FISH LAKE | FILLOH | 3370 | 1/01/87 | --- | 12.9E | 8.6 |
| FARRON | CAN. | 4000 | 12/30/86 | 22 | 3.5 | 5.6 | GREEN LAKE | FILLOH | 6000 | 1/01/87 | --- | 5.0E | 6.0 |
| OMAK LAKE, TWIN LAKES | | | | | | | GROUSE CAMP | FILLOH | 5380 | 1/01/87 | --- | 4.5E | 8.5 |
| SPOKANE RIVER | | | | | | | HORSE LAKE | FILLOH | 5400 | 1/01/87 | --- | 21.1E | 15.3 |
| ABOVE BURKE | | 4100 | 1/05/87 | 34 | 8.0 | 5.6 | STAMPEDE PASS | FILLOH | 3860 | 1/01/87 | --- | 21.1E | 13.7 |
| LOOKOUT | | 5140 | 1/05/87 | 50 | 13.6 | 10.5 | WHITE PASS ES | FILLOH | 4200 | 1/01/87 | --- | 11.9E | 10.1 |
| LOST LAKE | | 6110 | 12/31/86 | 65 | 20.2 | 17.2 | WHITE PASS ES | FILLOH | 4500 | 1/01/87 | --- | 7.1E | 7.6 |
| MOSQUITO RIDGE | | 5200 | 1/01/87 | -- | 12.5E | -- | AHANTUK CREEK | | | | | | 10.4 |
| SHERWIN | | 3200 | 1/02/87 | 19 | 3.7 | 3.9 | AHANTUK R.S. | 3100 | 12/29/86 | 14 | 2.6 | 6.4 | 3.6 |
| SUNSET | | 5540 | 1/01/87 | -- | 12.1E | -- | GREEN LAKE | FILLOH | 6000 | 1/01/87 | --- | 5.0E | 6.0 |
| NEWMAN LAKE | | | | | | | HILL CREEK | | | | | | |
| RAGGED RIDGE | | 3330 | 12/30/86 | 13 | 2.6 | 4.8 | HIGH RIDGE | FILLOH | 4980 | 1/01/87 | --- | 10.0E | 6.4 |
| SNOW COURSE | | | | | | | LEHIS AND COHLITZ RIVERS | | | | | | |
| | ELeVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-85 | WHITE PASS ES | FILLOH | 4500 | 1/01/87 | --- | 7.1E | 7.6 |
| | | | | | | | SNOW COURSE | ELeVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-85 |
| OKANOGAN RIVER | | | | | | | | | | | | | |
| BLACKHALL PEAK | CAN. | 6370 | 12/30/86 | 54 | 17.0 | 11.6 | WHITE RIVER | | | | | | |
| BRENDA MINE | CAN. | 4800 | 12/29/86 | 23 | 5.2 | 4.2 | CORRAL PASS | FILLOH | 6000 | 1/01/87 | --- | 22.5E | 13.7 |
| BRDOLMERE | CAN. | 3200 | 1/01/87 | 22 | 5.7 | .9 | HORSE LAKE | FILLOH | 5400 | 1/01/87 | --- | 21.1E | 15.5 |
| ENDERBY | CAN. | 6200 | 12/30/86 | 67 | 17.5 | 19.7 | GREEN RIVER | | | | | | 22.0 |
| GREYBACK RES | CAN. | 5120 | 12/30/86 | 17 | 3.0 | 4.4 | COUGAR Mtn. | FILLOH | 3200 | 1/01/87 | --- | 7.0E | 6.7 |
| HAMILTON HILL | CAN. | 4890 | 12/29/86 | 24 | 4.2 | 4.7 | GRASS MOUNTAIN #2 | 2900 | 1/05/87 | 12 | 3.0 | 2.7 | 5.4 |
| HARTS PASS | FILLOH | 6500 | 1/01/87 | -- | 19.1E | 15.4 | LESTER CREEK | 3100 | 1/05/87 | 30 | 4.5 | 7.2 | 6.6 |
| ISIHITOK LAKE | CAN. | 5500 | 12/26/86 | 10 | 2.4 | 3.4 | LYNN LAKE | 4000 | 1/05/87 | 24 | 7.0 | 10.2 | 7.8 |
| LOST HORSE MTN | CAN. | 4300 | 12/31/86 | 17 | 3.8 | 3.5 | SAHMIIL RIDGE | 4700 | 1/05/87 | 48 | 14.9 | 7.1 | 14.1 |
| HCCULLOCH | CAN. | 4200 | 12/31/86 | 14 | 2.3 | 2.8 | STAMPEDE PASS | FILLOH | 3860 | 1/01/87 | --- | 21.1E | 13.7 |
| MISSION CREEK | CAN. | 5800 | 12/30/86 | 29 | 6.5 | 9.7 | TWIN CAMP | 4100 | 1/05/87 | 42 | 11.4 | 9.5 | 10.3 |
| MT. KOBAU | CAN. | 5900 | 12/28/86 | 13 | 2.6 | 3.9 | CEDAR RIVER | | | | | | |
| SALMON Mtns | FILLOH | 4500 | 1/01/87 | -- | 2.3E | 3.1 | SHOUALAUME RIVER | | | | | | |
| SILVER STAR Mtn | CAN. | 6000 | 12/28/86 | 38 | 10.5 | 13.2 | SKYKOMISH RIVER | | | | | | |
| SUMMERLAND RES | CAN. | 4200 | 12/28/86 | 15 | 3.3 | 3.7 | STEVENS PASS | FILLOH | 4070 | 1/01/87 | --- | 20.0E | 15.5 |
| VASEUX CREEK | CAN. | 4600 | 12/19/86 | 8 | 1.4 | 2.5 | STEVENS PASS SAND SD | 3700 | 12/30/86 | 59 | 13.8 | 11.0 | 19.3 |
| WHITE ROCKS MTN | CAN. | 6000 | 12/30/86 | 33 | 9.3 | 6.9 | SHAGIT RIVER | | | | | | |
| METHOW RIVER | | | | | | | HARTS PASS | FILLOH | 6500 | 1/01/87 | --- | 19.1E | 15.4 |
| HARTS PASS | FILLOH | 6500 | 1/01/87 | -- | 19.1E | 15.4 | LYMAN LAKE | FILLOH | 5900 | 1/01/87 | --- | 27.1E | 20.0 |
| SALMON Mtns | FILLOH | 4500 | 1/01/87 | -- | 2.3E | 3.1 | RAINY PASS | FILLOH | 4780 | 1/01/87 | --- | 14.9E | 11.2 |
| CHELAN LAKE BASIN | | | | | | | BAKER RIVER | | | | | | |
| LYMAN LAKE | FILLOH | 5900 | 1/01/87 | -- | 27.1E | 20.0 | DUNGENESS RIVER | | | | | | |
| MIRROR LAKE | FILLOH | 5600 | 1/01/87 | -- | 17.4E | 11.5 | SNOW COURSE | ELeVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-85 |
| PARK CR RIDGE | FILLOH | 4600 | 1/01/87 | -- | 24.4E | 15.8 | | | | | | | |
| RAINY PASS | FILLOH | 4780 | 1/01/87 | -- | 14.9E | 11.2 | | | | | | | |
| ENTIAT RIVER | | | | | | | | | | | | | |
| HEMACHEE RIVER | | | | | | | | | | | | | |
| BERNE HILL CREEK | | 3170 | 12/30/86 | 46 | 10.4 | 7.9 | | | | | | | |
| ELLENBY PASS#2FILLOH | | 4270 | 1/01/87 | -- | 5.9E | 9.1 | | | | | | | |
| LYMAN LAKE | FILLOH | 5900 | 1/01/87 | -- | 27.1E | 20.0 | | | | | | | |
| HERRITI | | 2140 | 12/30/86 | 25 | 4.3 | 6.4 | | | | | | | |
| STEVENS PASS | FILLOH | 4670 | 1/01/87 | -- | 30.0E | 15.5 | | | | | | | |
| STEVENS PASS SAND SD | | 3700 | 12/30/86 | 59 | 13.8 | 11.0 | | | | | | | |
| SNOW COURSE | ELEVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-85 | | | | | | | |

The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

- Canada:** Ministry of the Environment, Water Investigations Branch, Victoria, British Columbia
- States:** Washington State Department of Ecology
Washington State Department of Natural Resources
- Federal:** Department of the Army
 Corps of Engineers
U.S. Department of Agriculture
 Forest Service
U.S. Department of Commerce
 NOAA, National Weather Service
U.S. Department of the Interior
 Bonneville Power Administration
 Bureau of Reclamation
 Geological Survey
 National Park Service
 Bureau of Indian Affairs
- Local:** City of Tacoma
City of Seattle
Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company
Snohomish County P.U.D.
~~Cowlitz Confederated Tribes~~
- Private:** Okanogan Irrigation District
Wenatchee Heights Irrigation District
Newman Lake Homeowners Association

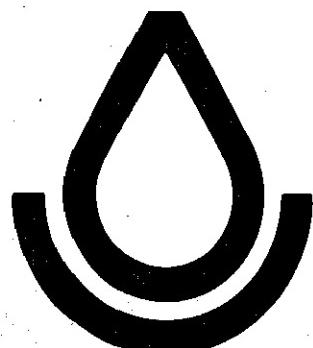
Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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SOIL CONSERVATION SERVICE
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